Lepidopsocidae, Trogiidae, Myopsocidae and Psocidae (Insecta: Psocoptera) from the Mount Royal Area, New South Wales

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Two species of Lepidopsocidae, two Trogiidae, two Myopsocidae and twelve species of Psocidae (including *Lasiopsocus hollowayi* sp.n., *Kaindipsocus emarginatus* sp.n. and *K. marksae* sp.n.) are recorded from the Mount Royal area in the Hunter Valley, New South Wales. The female of *Blaste bistriata* Schmidt and Thornton (Psocidae) is described and *Ptycta cornigera* New synonymised with *P. emarginata* New (Psocidae).

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KEYWORDS: Psocoptera, Trogiidae, Lepidopsocidae, Myopsocidae, Psocidae, *Lasiopsocus*, *Kaindipsocus*, *Blaste*, *Ptycta*, Mount Royal.

INTRODUCTION

This paper is based on Lepidopsocidae, Trogiidae, Myopsocidae and Psocidae (Insecta: Psocoptera) collected during a faunal survey of Tuglo Wildlife Refuge (34°14′N, 151°16′E) near Mount Royal, Hunter Valley, New South Wales. Myopsocids, psocids and lepidopsocids are nearly all inhabitants of bark. The two trogiids are common in buildings but are also found on bark. Months in which each species was collected are indicated in brackets. This is the final descriptive paper of a series which brings the total number of species recorded from the Refuge to 77.

PSOCOPTERA RECORDED FROM TUGLO WILDLIFE REFUGE

Lepidopsocidae

Echmepteryx (Loxopholia) brunnea Smithers (May, June, August, September, October, December) (common)
Echmepteryx (Thylacopsis) picta Smithers (April) (uncommon)

Trogiidae

Cerobasis guestfalica (Kolbe) (April) (common in house)
Lepinotus inquilinus Heyden (April, May, December) (common in house)

Myopsocidae

Myopsocus australis (Brauer) (April, May, June, August, October) (common)
Myopsocus incomptus Smithers (April, May, December) (uncommon)

Psocidae

Amphigerontiinae
Blaste bistriata Schmidt and Thornton (April, May) (few specimens)
Blaste lignicola (Enderlein) (April) (one specimen)
Blaste taylori New (January, March, May, June) (common)
Blaste tillyardi Smithers (January, August) (few specimens)
Lasiopsocus hollowayi sp. n. (May, December) (few specimens)
Cerastipsocinae
Sigmatoneura formosa (Banks) (January, November) (few specimens)
Psocinae
Clematostigma maculiceps (Enderlein) (March, April, May, June, October, November, December) (very common)
Kaindipsocus emarginatus sp.n. (March) (one specimen)
Kaindipsocus marksae sp.n. (May) (few specimens)
Ptycta campbelli Schmidt and Thornton (March, April, May, June, August, September, October, November) (very common)
Ptycta emarginata New (= *Ptycta cornigera* New **syn. nov.**) (June, August) (few specimens)
Ptycta umbrata New (April, June) (few specimens)

DESCRIPTIONS AND SYNONYMY

Blaste bistriata Schmidt and Thornton, 1992. *Mem. Mus. Vict.* 53(2):192, Figs 176–180.

Female material of this species was not available when Schmidt and Thornton (1992) described it. Two females from Tuglo are here referred to this species on the basis of the distinctive head and wing patterns and protruding eyes which are similar to those of *B. bistriata* males collected at the same locality.

Female

Colouration (in alcohol). As in male (Schmidt and Thornton, 1992:192).

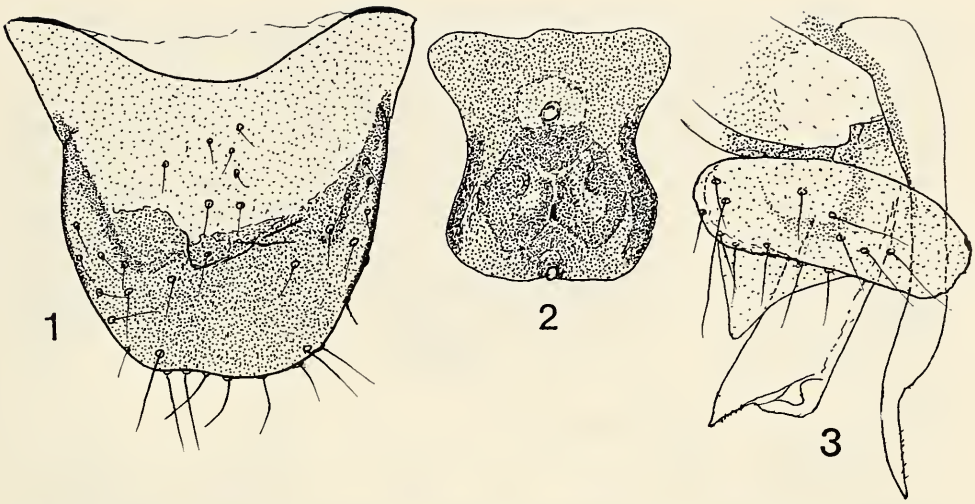
Morphology. Length of body: 3.5 mm. Median epicranial suture distinct to ocellar tubercle. Vertex at suture a little lower than laterally. Length of first flagellar segment: 0.65 mm. Antennae very fine, scape and pedicel short and broad. Eyes large, strongly protruding from dorso-lateral part of head capsule. IO/D: 2.0; PO: 0.83. Measurements of hind leg: F: 0.75 mm; T: 1.56 mm; t1: 0.57 mm; t2: 0.16 mm; rt: 3.5:1; ct: 23, 3. Legs long and slender. Fore wing length: 3.7 mm; width: 1.35 mm. Fore wing form and venation as in male but Rs and M meet in a point instead of being fused for a short length. Sc evanescent, ending free in costal cell, as in male. Epiproct (Fig. 1) large and well sclerotised, held somewhat erect. Paraproct with large, circular trichobothrial field. Subgenital plate with short, glabrous posterior lobe which has a transverse hind margin. Gonapophyses (Fig. 3) with broad ventral valve, distally narrow and finely spiculate. Dorsal valve broad, ending in spiculate extension. External valve well developed, consisting of an elongate-ovoid setose lobe and a tapering postero-dorsal glabrous lobe. Ninth sternite (Fig. 2) very heavily sclerotised around entrance to spermatheca.

Material examined

2 females, Tuglo Wildlife Refuge, 48 km north of Singleton, New South Wales, 7–13.v.1974, A.S. Smithers. 2 males, same locality, 15.iv.1984, A.S.Smithers.

Discussion

The female of *B. bistriata* has a distinctive head and wing pattern similar to that of the male (Schmidt and Thornton, 1992: Fig. 176). The gonapophyses resemble those of



Figures 1–3. Blaste bistriata Schmidt and Thornton. Female. (1). Epiproct. (2). Ninth sternite. 3. Gonapophyses.

B. lignicola (Enderlein) (Schmidt and Thornton, 1992: Fig. 189) but in that species the ventral valve is narrower and the pointed apex of the dorsal valve is more pronounced. There is considerable difference in the shape of the epiproct (Schmidt and Thornton, 1992: Fig. 187). The subgenital plate and gonapophyses of *B. bistriata* are similar to those of *B. tillyardi* but the sclerifications of the ninth sternite are different. (Smithers, 1969: Fig. 198).

Lasiopsocus hollowayi sp. n.

Female

Colouration (in alcohol). Head cream with pale brown marks. Irregular confluent spots on the epicranial plates except for a pale median band from epistomial suture to posterior part of plate. Frons pale brown. Postclypeus with parallel pale brown striae from epistomial suture to anterior margin. Anterior margin almost black. Genae pale. Antennae pale. Eyes black. Ocelli on dark brown tubercle. Maxillary palps pale, distal segment pale brown, darker than other segments. Legs pale brown. Fore wings (Fig. 4) hyaline with pale brown pattern as in figure.

Morphology. Length of body: 4.5 mm. Medial epicranial suture very distinct as far as ocellar tubercle, anterior arms absent. Length of flagellar segments: f1: 0.67 mm; f2: 0.55 mm. Eyes fairly small, not reaching level of vertex. IO/D: 3.3; PO: 0.77. Anterior ocellus much smaller than lateral ocelli. Epistomial suture very distinct, curving forwards a little anterior to ocellar tubercle. Measurements of hind leg: F: 0.95 mm; T: 1.67 mm; t1: 0.40 mm; t2: 0.16 mm; rt: 2.5:1; ct: 15, 0. Ctenidiobothria with basal combs hardly developed. Fore wing length: 3.6 mm; width: 1.24 mm. Fore wings (Fig. 4) with Rs and M fused for a length. M+Cu_1 slightly widened just basad of separation of M and Cu_1. R_{2+3} slightly sinuous. First section of Cu_{1a} barely longer than second and at slight angle to it. Veins and wing margin glabrous. Hind wing glabrous. Epiproct (Fig. 5) large, with lateral sclerotised strengthening bars in basal half. Hind margin of tergite anterior to

epiproct strongly sclerotised for a length opposite anterior corners of epiproct. Posterior margin of 9th tergite laterally well sclerotised to form a conspicuous, narrow band running down to base of gonapophyses. Paraprocts (Fig. 6) very lightly sclerotised with circular field of spaced trichobothria, one seta without basal rosette. Inner face of paraproct appears to be sculptured with densely packed lenticular rugosities in posterior region. Subgenital plate (Fig. 9) with long setose posterior lobe. Base of lobe glabrous. Gonapophyses (Fig. 8) long. Ventral valve long, narrow, ending in a short, sharply pointed apophysis. Dorsal valve broad, apically rounded, lightly sclerotised with field of fine papillae in distal quarter. External valve very lightly sclerotised in form of a divided lobe only one half of which is setose, the other long and apically narrowed, more than half the length of the dorsal valve. Sclerification of ninth sternite (Fig. 7) consists of two heavily sclerotised, irregularly ovoid plates and two very small sclerotised spots flanking entrance to spermatheca.

Male

Colouration (in alcohol). Body pattern similar to that of female but fore wing pattern not discernible.

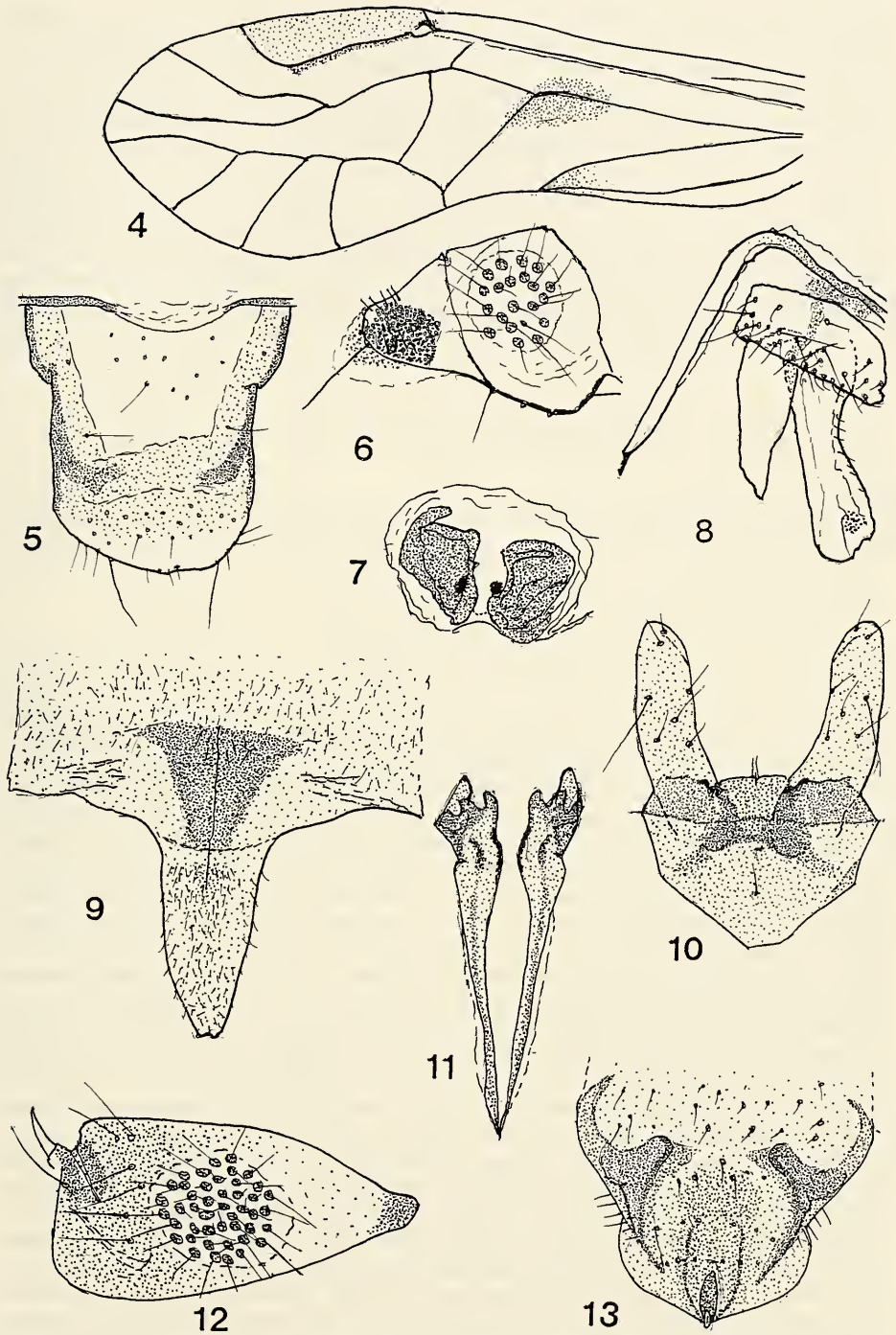
Morphology. Length of body: 4.3 mm. Medial epicranial suture as in female. Postclypeus with very strongly sclerotised anterior margin, as in female. Eyes large, reaching well above level of vertex. IO/D: 0.71; PO: 0.85. Ocelli large, median ocellus a little smaller than lateral ocelli. Measurements of hind leg: F: 0.57 mm; T: 1.3 mm; t1: 0.35 mm; t2: 0.11 mm; rt: 3.2:1; ct: 20, 2. Fore wing length: 3.5 mm; width: 1.4 mm. Fore wing as in female but Rs meets M in a point. Thickening of distal section of $M+Cu_1$ present but less pronounced than in females. First section of Cu_{1a} shorter than second, curved in opposite directions to one another so that the margin of the areola postica is strongly sinuous. Wings glabrous. Epiproct (Fig. 10) small, with a small median lobe and pair of elongated, erect, curved lobes, sparsely setose, the ends of which are entire. Paraprocts (Fig. 12) lightly sclerotised, simple, narrow basally, broadened distally with a large circular field of trichobothria, elsewhere sparsely setose. Postero-dorsal angle with a strong spur arising from a heavily sclerotised area of integument. Hypandrium (Fig. 13). Phallosome (Fig. 11) of two posteriorly diverging bars, broadest distally with the posterior end divided into several lobes.

Material examined

2 females (holotype and paratype), Tuglo Wildlife Refuge, 48 km north of Singleton, New South Wales, 7–13.v.1974, A.S.Smithers. 1 male paratype, same locality, 10.xii.1981, G.A. Holloway. Holotype and paratypes in the Australian Museum. This species is named for Geoff Holloway, in appreciation of his collecting Psocoptera over many years.

Discussion

When Enderlein (1907) erected the genus *Lasiopsocus* for *L. michaelseni* from Western Australia he gave as one of its obvious distinguishing features the presence of setae on the veins and wing margin of the fore wing. There are relatively few species in the large family Psocidae in which the fore wings are not glabrous. Smithers (1983) described a second species of *Lasiopsocus*, *L. simulatus* Smithers, based on a New South Wales specimen which had previously been misidentified as *L. michaelseni* and in which the setae on the fore wing are few and very small, being difficult to see except in the prepared specimen. A third species, *L. dicellus* Smithers (1984) was described from South Australia in which there are very few tiny wing setae. Other morphological features leave no doubt that the three species are congeneric. Although obvious in the type species, wing setae are clearly not a constantly obvious feature of the genus. In *L. michaelseni*, the largest species, with wing length in the male of 7.0 mm, both sexes have



Figures 4–13. Lasiopsocus hollowayi sp.n. Figs 4–9. Female. (4). Fore wing. (5). Epiproct. (6). Paraproct. (7). Ninth sternite. (8). Gonapophyses. (9). Subgenital plate. Figs 10–13. Male. (10). Epiproct. (11). Phallosome. (12). Paraproct. (13). Hypandrium.

hyaline wings without obvious colour pattern other than the usual darkening of the pterostigma. Some of the females have relatively short wings. In the type series Enderlein gave a wing length of 4.7 mm for the female. In *L. hollowayi* the wings are 3.5 mm (male) and 3.6 mm (female), hyaline in males and with a small area of pale brown just basal to the separation of Cu_1 and M the female (Fig. 4). In *L. dicellus* both sexes have wings of about 5.0 mm, larger than in *L. hollowayi*, without colour in the males. In the female wing there is a broad, dark, broken brown band at the basal third and brown membrane adjacent to the Rs and M meeting point. The female of *L. simulatus*, unfortunately, is not known but males of *L. simulatus* and *L. dicellus* are very similar, being distinguishable only on small differences in the proportions of their genitalia. It is likely that their females will also be similar to one another. Males of both species can be distinguished from *L. hollowayi* on wing size. The phallosome of *L. hollowayi* is distinctive and would not be confused with that of any other described species in the genus.

Kaindipsocus emarginatus sp. n.

Female

Colouration (in alcohol). Head, body and appendages creamy yellow. A pattern of irregular brown bands on front of head (Fig. 15) and two bands across genae, one at level of antenna base and the other below antenna. Fore wings (Fig. 14) hyaline with faint brownish pattern. Hind wings (both incomplete on available specimen) hyaline.

Morphology. Length of body: 3.5 mm. Head (Fig. 15) elongate. Dorso-lateral angles of head capsule protruding, forming incipient eye stalks. Vertex curved downwards between eyes. Median epicranial suture distinct, anterior arms absent. Epistomial suture very distinct. Anterior margin of postclypeus heavily sclerotised as a marginal band. Antennae with short, broad scape and pedicel. Flagellum very fine, bearing only a few fine, scattered setae. Apex of first flagellar segment slightly but distinctly swollen at joint with second. Length of flagellar segments: f1: 1.1 mm; f2: 1.08 mm. Eyes large (Fig. 15), of unusual, somewhat conical shape with medio-ventral edge emarginate. Seen from above inner margins diverge posteriorly, pigmented area reniform, emarginate medially. IO/D: 1.63; PO: 1.0. Ocelli small, median ocellus smaller than lateral ocelli. Lacinia similar to that of *K. marksae* (Fig. 21) and *K. mixtus* Smithers and Thornton. Distal segment of maxillary palp long, sides almost parallel, tapering distally to a rounded end. Metascutellum with mere suggestion of median apophysis. Measurement of hind leg: F: 1.1 mm; T: 2.3 mm; t1: 0.81 mm; t2: 0.16 mm; rt: 5:1; ct: 31, 3. Ctenidiobothria with small basal combs and long, fine setae. Claws long and slender, slightly curved near apex, with small preapical tooth. Legs very long and slender. Coxa of hind leg with well developed Pearman's organ. Fore wing length: 4.8 mm; width: 1.8 mm. Sc ends free in costal cell. Pterostigma strongly concave proximal to hind angle, which is acute and bears an obvious spurvein. Rs and M joined by a crossvein. R_{4+5} approaching M. Veins R, $M+Cu_1$, 1A and basal section of hind margin of wing as far as nodulus, thickened. Cu_1 strongly arched where it forms the proximal margin of the discoidal cell. Areola postica tall, with narrow apex. Basal section of Cu_{1a} at angle to second. Hind wings incomplete in only available specimen. Epiproct damaged in preparation, but similar to that of *K. marksae*. Paraproct (Fig. 16) lightly sclerotised, with large field of trichobothria and a ventral, posteriorly directed apophysis. Subgenital plate (Fig. 17) with posterior median lobe, glabrous end rounded. Inner surface with sclerotisation. A transverse fold present at base of posterior lobe. Gonapophyses (Fig. 18). well sclerotised, the ventral valve narrow with an even narrower distal section. Dorsal valve broad with a narrow apical section. External valve setose with a posterior, small, glabrous lobe. Sclerotisation of ninth sternite (Fig. 19).

Male

Unknown.

Material examined

1 female (holotype), Tuglo Wildlife Refuge, 48 km north of Singleton, New South Wales, 31.iii.1975, A.S.Smithers. Holotype in the Australian Museum.

Discussion

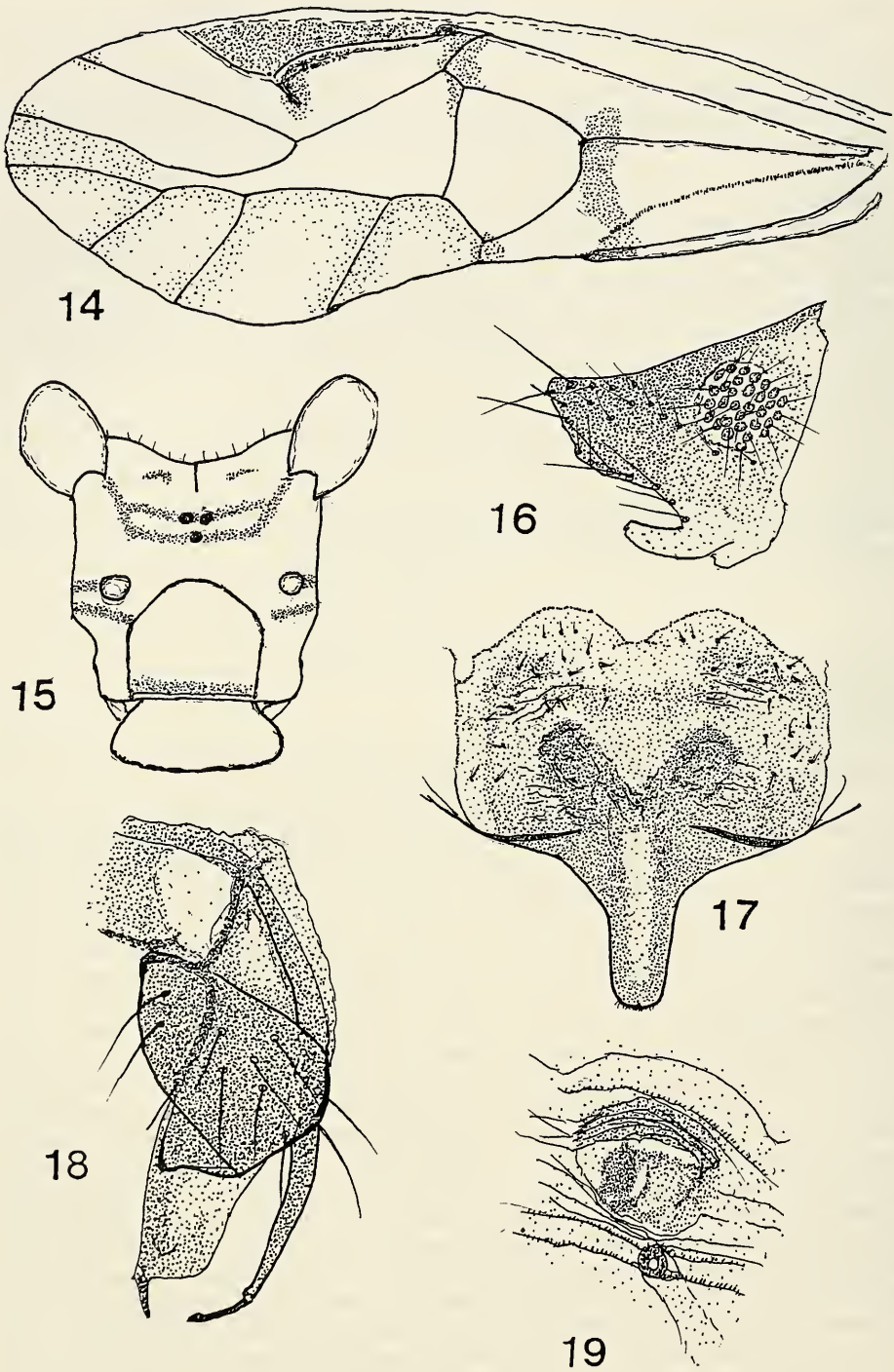
K. emarginatus differs from *K. marksae* in being bigger and in having a facial pattern. It is about the same size as *K. mixtus*. It differs most obviously from both *K. mixtus* and *K. marksae* in having Cu_1 very strongly curved where it forms the posterior proximal margin of the discoidal cell so that the cell is strongly convex along the proximal edge and in the almost conical shape of the eyes. All three species have the eyes somewhat protruding at the dorso-lateral angles of the head. The shape of the sclerotisations at the entrance to the spermatheca are distinctive. The discovery of two species of *Kaindipsocus* at the northern edge of the Hunter Valley in New South Wales is unexpected, the genus having been previously known only from a few specimens from high altitudes in New Guinea. At present its distribution elsewhere is not known but its close relationship to other genera in New Guinea, such as *Elytropsocus* Smithers and Thornton, suggests that it might be a relatively recently-arrived invasive element of that part of the Australian fauna which has a northern origin.

Kaindipsocus marksae sp. n.

Female

Colouration (in alcohol). Head, body and appendages pale creamy yellow. Eyes pale brown. Fore wings (Fig. 20) hyaline with faint brown areas.

Morphology. Length of body: 2.5 mm. Head somewhat elongated, widened dorsally. Eyes large, almost spherical, placed high at dorso-lateral angles of head, the vertex between them very slightly downcurved. IO/D: 1.6; PO: 0.9. Median epicranial suture distinct, anterior arms absent. Epistomial suture very well developed. Flagellum of antenna very fine in relation to somewhat enlarged scape and pedicel, setae few and very fine. Ocelli small. Apex of lacinia (Fig. 21) with very well developed outwardly curved outer tine which is apically rounded. Fourth segment of maxillary palp long, widest at about 2/3rds of length from base, beyond which it tapers to end in a rounded apex. Meso- and metascutellum heavily sclerotised, median plate only slightly raised into a suggestion of an apically rounded apophysis. Legs, especially those of metathorax, long and slender. Pearman's organ well developed on hind coxae. Measurement of hind leg: F: 0.89 mm; T: 1.78 mm; t1: 0.62 mm; t2: 0.14 mm; rt: 4.4:1; ct: 29, 2. Ctenidiobothria with small basal combs and long, fine setae. Claws long, narrow, only slightly curved distally, with small preapical tooth. Fore wing length: 3.2 mm; width: 1.3 mm. Fore wing (Fig. 20) glabrous. Sc ends free in costal cell. Pterostigma strongly concave basal of apex, slightly convex distal to apex, which has a short but not obvious spurvein in some wings. Rs and M joined by a long crossvein. R_{2+3} straight, R_{4+5} strongly sinuous, approaching M closely in basal part. Cu_1 slightly curved, giving a slightly convex proximal margin to the discoidal cell. M almost straight beyond Rs-M crossvein. Areola postica tall. Basal section of Cu_{1a} straight, longer and at a strong angle to second section so that the areola postica is tall with a narrow apex. M_1 and M_3 curved, M_2 straight. Hind wing with Rs and M fused for a length. Terminal abdominal structures lightly sclerotised. Epiproct (Fig. 22) elongate, tapering to narrower, rounded, hind margin, laterally reinforced by more heavily sclerotised sinuous bars. Paraproct (Fig. 23) with large, circular field of



Figures 14–19. Kaindipsocus emarginatus sp.n. Female. (14). Fore wing. (15). Head. (16). Paraproct. (17). Subgenital plate. (18). Gonapophyses. (19). Ninth sternite.

densely packed trichobothria and with large, posteriorly-directed, elongate ventral lobe which is dorsally curved towards distal end. Subgenital plate (Fig. 25) with elongate posterior lobe, posteriorly rounded without setae. At base of lobe the plate has a transverse fold anterior to which the plate is sparsely setose with fine setae. Gonapophyses (Fig. 26). Sclerotisation of the ninth sternite (Fig. 24) well developed, complex.

Male

Unknown.

Material examined

4 females, including holotype, Tuglo Wildlife Refuge, 48 km north of Singleton, New South Wales, 7–13.v.1974, A.S.Smithers. Holotype and paratypes in the Australian Museum. This species is named for Heidi Marks in appreciation of her help in taking care of a Malaise trap used in the Tuglo survey during my absence.

Discussion

Kaindipsocus marksae is clearly congeneric with *K. mixtus*, described from New Guinea. It is similar in wing venation and in wing pattern, genitalia, unusual form of the lacinial tip, presence of a ventral lobe on the female paraproct, sclerotisation of the ninth sternite, in having the posterior lobe of the subgenital plate glabrous and the unusual development of raised areas on the meso- and metascutellum. The unusual, presumably stridulatory, structure of the meso- and metascutellum is similar to that found in *Kaindipsocus mixtus* (cf. Smithers and Thornton 1981:959, Figs 97–99) but is very much smaller and less conspicuous than in that species. It differs from *K. mixtus* and *K. emarginatus*, in being smaller (forewing length 3.2 mm, cf. 4.6 mm in *K. mixtus* and 4.8 mm in *K. emarginatus*), in having differences in the wing pattern and in having a relatively longer and narrower posterior lobe to the subgenital plate. Although there is apparently no facial colour pattern in this species, *K. mixtus* does have a dark line from the eye to the anterior margin of the postclypeus on each side and *K. emarginatus* has dark bands across the front of the head. It is possible that *K. marksae* has a facial pattern which has been lost during storage in alcohol. There seems to be some degree of correlation between development of characteristic and unusual facial patterns and presence of large, protruding compound eyes in the Psocoptera, e.g. as seen also in the Australian species *Blaste macrops* Smithers and *B. tillyardi*.

Ptycta emarginata New

Ptycta emarginata New, 1974. *J. Aust. ent. Soc.* 13:299, Figs 48–50 (female).
Ptycta cornigera New, 1974. *J. Aust. ent. Soc.* 13:301, Figs 54–57 (male) (**syn. nov.**).

New (1974) described *Ptycta emarginata* (female only) and *P. cornigera* (males only) from Jandakot, Western Australia. Ten females and five associated males in the Tuglo material identifiable as *P. emarginata* and *P. cornigera* respectively leave no doubt that they represent the two sexes of the same species. *Ptycta cornigera* is, therefore, considered to be a synonym of *Ptycta emarginata* (**syn. nov.**).

ACKNOWLEDGMENTS

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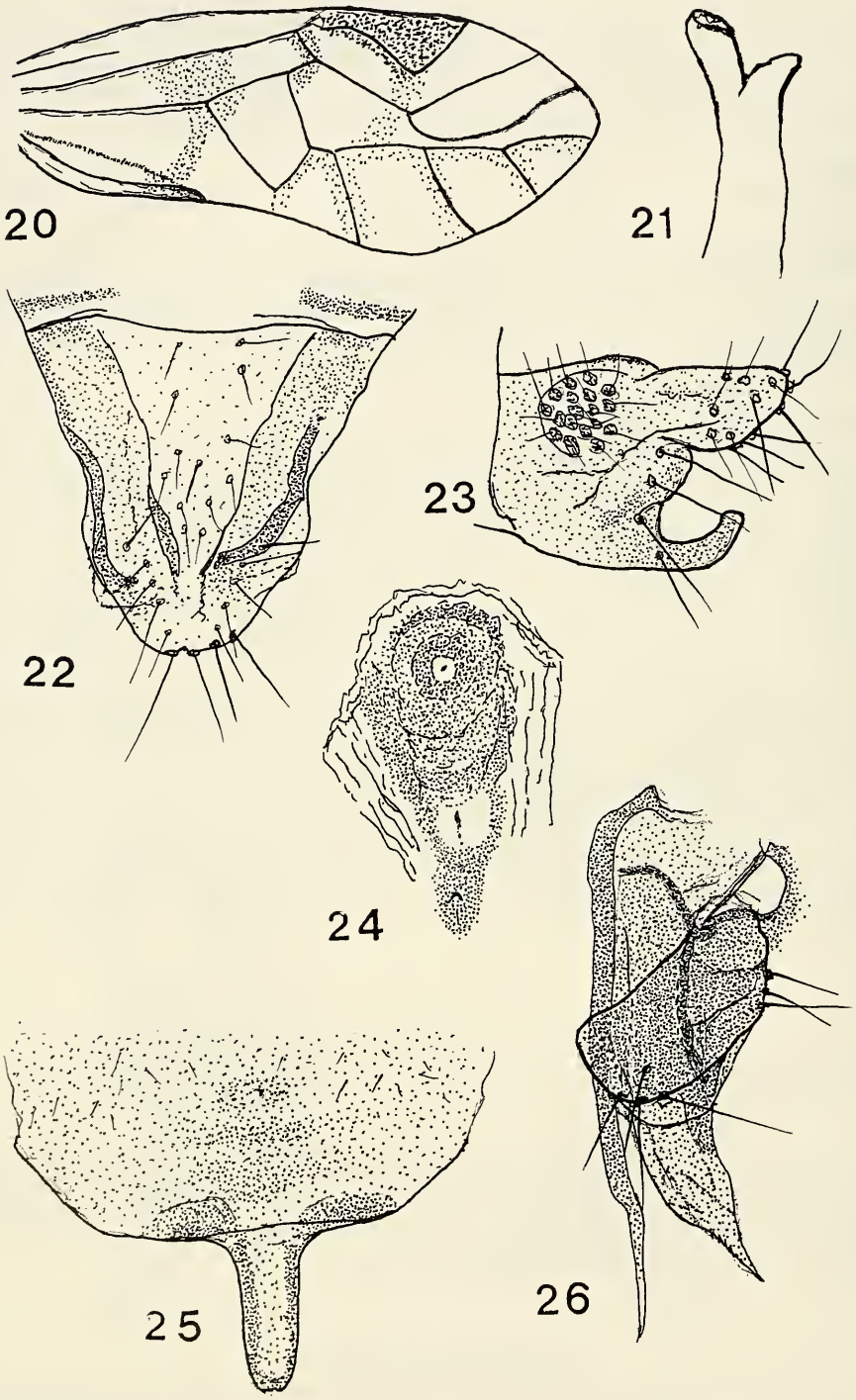

Figures 20–26. Kaindipsocus marksae sp.n. Female. (20). Fore wing. (21). Lacinia. (22). Epiproct. (23). Paraproct. (24). Ninth sternite. (25). Subgenital plate. (26). Gonapophyses.

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